THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. A method of heating a refractory oxide material, said method comprising applying a high frequency electric field to heat said refractory oxide material and applying a magnetic field to heat said refractory oxide material, said high frequency electric field substantially heating said refractory oxide material to a temperature range at which said refractory oxide material undergoes a transition in electrical resistivity from an insulator to a conductor, and the magnetic field inductively heats said refractory oxide material during and/or after said transition.

2. A method as claimed in claim 1, wherein said high frequency electric field and said magnetic field is imparted to said refractory oxide material via a resonant structure.

3. A method as claimed in claim 2, wherein the frequency imparted via the resonant structure is carried out within a first range of frequencies at which heating is substantially carried out by the electric field, and then subsequently lowered to a second range of frequencies at which heating is substantially carried out by the magnetic field.

4. A method as claimed in claim 3, wherein said first range of frequencies is in the range of 13MHz-42MHz.

5. A method as claimed in claim 3, wherein said second range of frequencies is in the range of 0.5MHz-13MHz.

6. A method of heating a refractory oxide material as claimed in claim 1, wherein said refractory oxide material is held within a container and said high frequency electric field is substantially imparted to said refractory oxide material by two spaced apart plates connected to an electric circuit, and said magnetic field is imparted by an RF coil surrounding said container.

7. A method of heating a refractory oxide material as claimed in claim 1, wherein said refractory oxide material is held with a non-faraday container and both said high frequency electric field and said magnetic field is imparted by an RF coil surrounding said non-faraday container.

8. A method of heating a refractory oxide material as claimed in claim 1, wherein said method is used in the manufacture of a synthetic gemstone.

9. A method of heating a refractory oxide material as claimed in claim 1, wherein said method is used to vitrify a hazardous or other waste material.

10. A crucible apparatus for heating a refractory oxide material, said apparatus comprising a means for supporting said refractory oxide material, a means for imparting a high frequency electric field to said refractory oxide material and a means for imparting a magnetic field to said refractory oxide material.

11. A crucible apparatus as claimed in claim 10, wherein said crucible comprises a resonant structure.

12. A crucible apparatus as claimed in claim 10, comprising a container adapted to hold said refractory oxide material, and said means for imparting a magnetic field to said refractory oxide material is an RF coil surrounding said container.

13. A crucible apparatus as claimed in claim 12, wherein said crucible is connected to a variable frequency generator.

14. A crucible apparatus as claimed in claim 13, wherein said variable frequency generator is adapted to impart a frequency in the range 0.5MHz-42MHz.

15. A crucible apparatus as claimed in claim 10, wherein said means for imparting a high frequency electric field includes two spaced apart plates connected to an electric circuit.

16. A crucible apparatus as claimed in claim 15, wherein the capacitance between said two spaced apart plates may be variably adjusted.

17. A crucible apparatus as claimed in claim 15, wherein at least one of said two spaced apart plates is water-cooled.

18. A crucible apparatus as claimed in claim 13 comprising a sensing means for sensing the temperature of said refractory oxide material, said sensing means operably connected to a control means which varies the frequency imparted by said variable frequency generator relative to the sensed temperature.

19. A crucible apparatus as claimed in claim 10, wherein said means for imparting a magnetic field to said refractory oxide material is adapted to substantially heat same at a frequency in the range 0.5MHz-13 MHz.

20. A crucible apparatus as claimed in claim 10, wherein said means for imparting a electric field to said refractory oxide material is adapted to substantially heat same at a frequency in the range 13MHz-42 MHz.

21. A crucible apparatus as claimed in claim 10, wherein said crucible comprises a non-faraday container adapted to hold said refractory oxide material, and said means for imparting an electric field to said refractory oxide material is an RF coil surrounding said non-faraday container, and said means for imparting a magnetic field to said refractory oxide material is said RF coil.